

REMARKS

The amendments add no new matter to the application. Amendment to claim 12 is for the purpose of clarifying what Applicants regard as the invention of the subject application.

Objection to drawings under 37 C.F.R. § 1.83(a)

The drawings stand objected to under 37 C.F.R. § 1.83(a) because the drawings do not show the features of the structures specified in claims 10 and 22. Claim 10 has been canceled. Applicants submit that while a drawing is required to show every feature of the structure specified in the claim(s) that corresponds to the drawing, there is no requirement that an application must include corresponding embodiment drawing(s) for *all* claims. Furthermore, because the specification (particularly page 10, lines 8-20) describes sufficient details for one skilled in the art to understand the subject matter of claim 22, Applicants submit that adding a drawing corresponding to claim 22 is not necessary under 37 C.F.R. § 1.81. As such, Applicants respectfully request that the objection to the drawings be withdrawn.

Claim rejection(s) based on 35 U.S.C. § 112.

Claims 10 and 22 stand rejected under 35 U.S.C. § 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to make and/or use the invention. According to the Office Action, applicants have not described or shown a transistor die attached to a mounting area without a mounting flange. Applicants respectfully disagree. Claim 10 has been canceled, rendering the § 112 rejection to claim 10 moot. The subject matter of claim 22 is described, at least, on page 10, lines 8-20 of the specification. For at least this reason, Applicants request that the rejections under § 112 of claim 22 be withdrawn.

Claim rejection(s) based on 35 U.S.C. § 102(b).

Claims 1-2, 4, 6, 9, 11-15, 18, 21 and 23 stand rejected under 35 U.S.C. § 102(b) over U.S. Patent No. 5,763,951 issued to Hamilton et al (Hamilton). Claims 1-11 have been canceled, rendering the § 102 rejections to claims 1-2, 4, 6, 9, and 11 moot. With respect to the remaining claims, Applicants respectfully note that in order to sustain a rejection under §102, each element in the rejected claim must be found, either expressly or inherently, in the cited reference.

Amended claim 12 recites a thermal management system, the thermal management system comprising a heat sink having an interior lumen, and a coolant circulation channel at least partially formed in a layer of the PCB, the coolant circulation channel being in fluid communication with the heat sink lumen. Hamilton does not disclose or suggest such a structure. Rather, Hamilton describes a circuit board having a channel that is defined completely within the circuit board. (Abstract and Figure 3). In particular, Hamilton describes forming a channel on a surface of a heat exchanger 164 (Figure 4). There is nothing in Hamilton that discloses or suggests a heat sink having an interior lumen, or a coolant circulation channel at least partially formed in a layer of the PCB in fluid communication with the heat sink lumen, as is recited in claim 12. As such, claim 12 is believed allowable over Hamilton. For at least the same reason that claim 12 is allowable, claims 13-15, 18, 21, and 23, which depend from claim 12, are also believed allowable over Hamilton.

Claim rejection(s) based on 35 U.S.C. § 103(a).

Claims 3, 5, 7, 8, 16, 17, 19 and 20 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Hamilton in view of U.S. Patent No. 4,396,505 issued to Little. Claims 10 and 22 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Hamilton and Little, and further in view of U.S. Patent No. 5,801,442 issued to Hamilton et al (Hamilton 442). Claims 1-11 have been canceled, rendering the § 103 rejections to claims 3, 5, 7, 8, and 10 moot. For at least the same reasons that claim 12 is allowable, claims 16, 17, 19, 20, and 22, which depend from claim 12, should also be allowable. Furthermore, Applicants submit that Little is not a relevant art because it does not teach cooling of electronic power transistor devices or printed circuit boards. Rather, Little teaches manufacturing of refrigerators for superconducting devices, such as supersensitive

magnetometers, voltmeters, ammeters, voltage standards, and current comparators. (Abstract, and Column 1, line 12 to Column 2, line 42) Because Little cannot form the basis of a § 103 rejection, Applicants respectfully request that the rejections to claims 16, 17, 19, 20, and 22 be withdrawn.


CONCLUSION

Based on the foregoing, Applicants submit that the remaining claims are allowable and a Notice of Allowance is respectfully requested. If the Examiner has any questions or comments regarding this amendment, the Examiner is asked to contact the undersigned at the number listed below.

Respectfully submitted,

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Enclosure: Marked up version of the amended claims pursuant to 37 C.F.R. § 1.121(c)(1)(ii).

Marked up version of the amended claims pursuant to 37 C.F.R. § 1.121(c)(1)(ii).

12. (Amended) An assembly comprising:
a heat-generating device attached to a printed circuit board (PCB), and
a thermal management system, the thermal management system comprising a heat sink
having an interior lumen, and a coolant circulation channel at least partially formed in a layer of the
PCB, the coolant circulation channel being in fluid communication with the heat sink lumen.